

NON-PUBLIC?: N  
ACCESSION #: 8902060375  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: MILLSTONE NUCLEAR POWER STATION UNIT 3 PAGE: 1 OF 4

DOCKET NUMBER: 05000423

TITLE: REACTOR TRIP DUE TO LOSS OF NORMAL 4160V BUS DUE TO PROCEDURAL DEFICIENCY  
EVENT DATE: 12/29/88 LER #: 88-028-00 REPORT DATE: 01-27-89

OPERATING MODE: 1 POWER LEVEL: 075

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION 50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Robert D. Conway, Senior Engineer TELEPHONE: (203) 447-1791

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 1710 on December 29, 1988, while operating in mode 1, 75% power 578 degrees, 2250 psia, a reactor trip on negative flux rate occurred when loss of the normal 4160V bus, 34B, deenergized one of the two 120V supply circuits to the Control Rod Drive System. An undetectable failure existed in the other 120V supply circuitry such that when the first supply was lost, control rods unlatched. Unit 4160V electric buses were being supplied by the, Reserve Station Service Transformers. The B Emergency Diesel Generator was started for surveillance testing. When the B Emergency Diesel Generator was paralleled to the emergency 4160V bus 34D, the normal to emergency bus tie breaker opened on reverse overcurrent trip, deenergizing the normal bus 34B. Procedures did not provide adequate operator guidance on the required electric plant lineup prior to paralleling an Emergency Diesel Generator when 4160V buses were supplied from the Reserve Station Service Transformer. The procedure has been corrected. The failure in the Control Rod Drive System will be corrected during the next reactor shutdown period.

END OF ABSTRACT

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#### I. Description of Event

At 1710 on December 29, 1988, while operating in Mode 1, 75% power, 578 degrees, 2250 psia, a reactor trip on negative flux rate occurred when the 120V supply power to the Control Rod Drive System was deenergized due to

loss of the normal 4160V bus, 34B. Refer to Figure 1, "Electrical Distribution System."

At 1617 on December 29, 1988, the power supplies to the unit's 4160V alternating current (AC) electrical buses were shifted from the Normal Station Service Transformer (NSST) to the Reserve Station Service Transformers (RSST). This was done to prevent a possible out-of-phase fast transfer from the NSST to the RSST in the event of a single failure of the switchyard pilot wire relays to switchyard breakers 15G-13T-2 and 15G-14T-2. The possibility of an out-of-phase transfer from the NSST to the RSST due to the opening of switchyard breakers 15G-13T-2 and 15G-14T-2 is discussed in detail in Licensee Event Report 50-423/88-026, "Potential Damage to Safety Related Equipment Due to Design Inadequacy." Following transfer to the RSST, operability surveillance tests of the emergency diesel generators were started, in accordance with Plant Technical Specification 3.8.1. At 1709, the B Emergency Diesel Generator was paralleled to the B train emergency 4160V bus, 34D. At 1710 the bus tie circuit breaker between the B train emergency bus 34D and the normal 4160V bus 34B opened on reverse overcurrent trip, deenergizing the normal bus.

Loss of the normal 4160V bus 34B deenergized various 480V and 120V normal buses, including one of two 120V supplies to the Control Rod Drive System cabinets. The second 120V supply to the Control Rod Drive System comes from phase A of the Rod Control Motor-Generators. A failure existed in this second 120V supply circuitry in one of the Control Rod Drive cabinets. The cabinets contain monitoring and alarm circuits to detect failures, but the complexity of the circuitry prevents failure detection in all components. Loss of the first 120V power source, combined with the existing failure in the second 120V supply circuitry, deenergized the cabinet, unlatching the control rods supplied by the cabinet. A reactor trip resulted on negative neutron flux rate. A turbine trip resulted from the reactor trip.

At the time of the trip, operators verified that the Reactor Trip Breakers were open, that all control rods were fully inserted and that neutron flux

was decreasing. A Feedwater Isolation was received due to low Average Reactor Coolant System Temperature following the trip. An Auxiliary Feedwater actuation occurred as a result of a steam generator low-low level signal. These are normal plant responses following a trip. Other automatic, and manually initiated Engineered Safeguards Features actuations were not required, Main Steam Isolation Valves were shut, and feedwater pumps were stopped to control the plant cooldown. The plant was stable in Mode 3 (Hot Standby), 555 degrees and 2170 psia, at 1740, based on average Reactor Coolant System temperature returning to a stable value. Power to the 4160V normal bus, 34B, was restored.

## II. Cause of Event

The cause of the event was procedural inadequacy. The operating procedure for starting and paralleling emergency diesel generators to emergency buses did not provide adequate direction for operators on the required electric plant lineup when the RSST is the power supply for all plant loads. The normal to emergency tie breaker reverse overcurrent trip prevents the diesel from supplying normal 4160V loads in addition to emergency 4160V loads. This protective feature of the tie breaker is a concern only when Unit electrical buses are supplied from the RSST.

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## III. Analysis of Event

This event is reportable under 10CFR50.73(a)(2)(iv). Immediate notifications were performed in accordance with 10CFR50.72(b) (2) (ii). Emergency electrical buses were not adversely affected.

The Control Rod Drive System monitors circuits in the cabinets, but due to the complexity of the electronic circuitry, failures in all circuit components cannot be detected. The undetectable failure in the secondary 120V supply circuitry in one of the Control Rod Drive cabinets did not adversely affect safety since the failure contributed to deenergizing the cabinet and releasing control rods. Deenergizing the Control Rod Drive cabinets released control rods immediately; the reactor was subcritical before the reactor trip breakers opened on negative flux rate trip.

Had the failure in the secondary 120V circuit of a Control Rod Drive cabinet not existed, a turbine trip and reactor trip would have resulted from secondary plant transients. These secondary plant transients resulted when loss of 4160V normal bus 34B deenergized circulating water pumps, condensate pumps, moisture separator drain pumps, main steam reheater drain pumps, and other 4160V loads and 480V buses.

The Control Rod Drive System is not safety related. Reactor operation was resumed since the failure did not affect the response of safety systems, or the ability of the reactor protection system to initiate a reactor trip.

Only one of two normal 4160V buses was deenergized. The two 4160V emergency buses, which power safety related components, were not affected. Therefore, public health and safety were not affected. There was no release of radionuclides associated with this event.

#### IV. Corrective Action

Operating procedures were revised to provide additional direction to operators when starting emergency diesel generators when the RSST is supplying plant loads. Operators are directed to supply normal buses from the NSST, emergency buses from the RSST, and open the tie breakers between normal and emergency buses, prior to connecting the diesel generator to the emergency bus. This electric plant configuration was established prior to the startup of the Unit on December 31, 1988. On January 12, 1989, the normal electric plant lineup was restored based on a temporary circuit modification which prevents the out of phase transfer from occurring. Refer to LER 50-423/88-026, "Potential Damage to Safety Related Equipment Due to Design Inadequacy." The failure in the Control Rod Drive System will be corrected during the next reactor shutdown period.

#### V. Additional Information

There are no previous Licensee Event Reports with the same root cause and sequence of events. LER 50-423/ 88-026, "Potential Damage to Safety Related Equipment Due to Design Inadequacy," discusses in detail the plant conditions which initiated this event.

#### SYSTEMS

Control Rod Drive System - AA

Medium Voltage Power System - EA

Low Voltage Power System - EC

Emergency Onsite Power Supply System - EK

#### COMPONENTS

Relay, AC Directional Overcurrent - 67

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FIGURE OMITTED - NOT KEYABLE (DRAWING)

ATTACHMENT 1 TO 8902060375 PAGE 1 OF 1

NORTHEAST UTILITIES General Offices Selden Street, Berlin Connecticut

The Connecticut Light And Power Company  
Western Massachusetts Electric Company P.O.BOX 270  
Holyoke Water Power Company  
Northeast Utilities Service Company HARTFORD,CONNECTICUT  
06414-0270 Northeast Nuclear Energy Company (203)665-5000

January 27, 1989  
MP-12687

Re: 10CFR50.73(a)(2)(iv)

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Reference: Facility Operating License No. NPF-49  
Docket No. 50-423  
Licensee Event Report 88-028-00

Gentlemen:

This letter forwards Licensee Event Report 88-028-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2) (iv), any event or condition that resulted in automatic actuation of the Reactor Protection System (RPS).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace  
Station Superintendent  
Millstone Nuclear Power Station

SES/RDC:faj

Attachment: LER 88-028-00

cc: W. T. Russell, Region I Administrator  
D. H. Jaffe, NRC Project Manager, Millstone Unit Nos. 2 and 3  
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3

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